UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION
PREVENTION

September 29, 2014

MEMORANDUM

SUBJECT: Efficacy Review for Hitman Spray;
EPA Reg. No. 9402-14
DP Barcode: D420870

FROM: Marc Rindal, Microbiologist
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Antimicrobials Division (7510P)

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TO: Marshall Swindell, PM33/Demson Fuller
Regulatory Management Branch I
Antimicrobials Division (7510P)

APPLICANT: Kimberly-Clark Global Sales, LLC
2100 Winchester Road
Neenah, WI 54956

FORMULATION FROM LABEL:

Active Ingredient(s)	% by wt.
Hydrogen Peroxide	3.30%
Didecyldimethylammonium carbonate and didecyldimethylammonium bicarbonate	1.38%
Inert Ingredients	95.32%
Total	**100.00%**

I BACKGROUND

The product, Hitman Spray (EPA Reg. No. 9402-14), is a registered ready-to-use spray product for use as a bactericide (disinfectant, virucide, and fungicide), sanitizer (non-food contact sanitizer and non-food contact residual self-sanitizer), mildewstat, and deodorizer for use on hard, non-porous surfaces. The product is intended for use in institutional, industrial or commercial establishments. Label directions indicate that the product is a one-step disinfectant. Through the current submission, the applicant has requested to amend the registration to include additional viruses. Studies were conducted at ATS Labs, located at 1285 Corporate Center Drive, Suite 110, Eagan, MN 55121.

This data package contained a letter from the registrant's representative (dated June 6, 2014), Good Laboratory Practice Statements for both studies, two efficacy studies (MRID 493950-01 and -02), Statements of No Data Confidentiality Claims, and the proposed label.

II USE DIRECTIONS

The product is designed for sanitizing (hard, non-porous and soft surfaces) and disinfecting hard, non-porous surfaces including: desktops, doorknobs, faucets, chairs, cell phones, computers, soap dispensers, vanities, telephones, shower walls, kitchens, bathrooms, light switches, refrigerator exteriors, garbage cans, mouse pads, offices, laundry rooms, toilets, range hoods, and stove tops. The product is also for use (as a sanitizer) on washable soft surfaces such as, drapes, gym bags, diaper bags, upholstery, uniforms, shower curtains, pillows, sleeping blankets, sofas, oven mitts and rugs. The proposed label indicates that the product may be used on hard, non-porous surfaces, including: aluminum, brass, ceramic, Corian®, glass, granite, laminate, stainless steel, vinyl, glazed porcelain, painted surfaces, polycarbonate, polypropylene, polyurethane varnish, and silicone rubber. Directions on the proposed label provide the following information regarding use of the product:

Disinfectant (bacteria, viruses, and fungi/mold): To disinfect hard, non-porous surfaces, spray 6-8 inches from surface until thoroughly wet. Let stand for 5 minutes. Wipe dry. Remove heavy soil prior to disinfection. To disinfect Norovirus, let stand for 6 minutes.

Non-Food Contact Sanitizer: For hard, non-porous, non-food contact surfaces, spray 6-8 inches from surface until thoroughly wet. Let stand for 15 seconds. Wipe dry. Remove heavy soil prior to sanitization.

Residual Self-Sanitizer: To sanitize for 24 hours against *Staphylococcus aureus*, *Enterobacter aerogenes*, and Community Acquired Methicillin Resistant *Staphylococcus aureus* (CA-MRSA) on hard, non-porous surfaces. Spray 6-8 inches from surfaces until thoroughly wet. Let stand for 5 minutes. Wipe dry. This product can be removed with soap and water. Repeat residual self-sanitizing directions to maintain 24 hours sanitization.

Soft Surface Sanitizer: Test a hidden section of fabric. Spray 6-8 inches from surface until moderately damp. DO NOT SATURATE. Fabric must remain wet for 30 seconds. Let air dry.

III AGENCY STANDARDS FOR PROPOSED CLAIMS

Virucides: The effectiveness of virucides against specific viruses must be supported by efficacy

data that simulates, to the extent possible in the laboratory, the conditions under which the product is intended to be used. Carrier methods that are modifications of either the AOAC Use-Dilution Method (for liquid disinfectants) or the AOAC Germicidal Spray Products as Disinfectants Method (for spray disinfectants) must be used. To simulate in-use conditions, the specific virus to be treated must be inoculated onto hard surfaces, allowed to dry, and then treated with the product according to the directions for use on the product label. One surface for each of 2 different product lots of disinfectant must be tested against a recoverable virus titer of at least 10^4 from the test surface for a specified exposure period at room temperature. Then, the virus must be assayed by an appropriate virological technique, using a minimum of four determinations per each dilution assayed. Separate studies are required for each virus. The calculated viral titers must be reported with the test results. For the data to be considered acceptable, results must demonstrate complete inactivation of the virus at all dilutions. When cytotoxicity is evident, at least a 3-log reduction in titer must be demonstrated beyond the cytotoxic level.

Supplemental Claims: An antimicrobial agent identified as a "one-step" disinfectant or as effective in the presence of organic soil must be tested for efficacy with an appropriate organic soil load, such as 5 percent serum. On a product label, the hard water tolerance level may differ with the level of antimicrobial activity (e.g., sanitizer vs. disinfectant) claimed. To establish efficacy in hard water, all microorganisms (i.e., bacteria, fungi, and viruses) claimed to be controlled must be tested by the appropriate Recommended Method at the same hard water tolerance level.

IV COMMENTS ON THE SUBMITTED EFFICACY STUDIES

1. MRID 493950-01, "Virucidal Efficacy of a Disinfectant for Use on Inanimate Environmental Surfaces", Virus: Human Immunodeficiency Virus type 1, for Hitman, by Mary J. Miller, M.T. Study conducted at ATS Labs located at 1285 Corporate Center Drive, Suite 110, Eagan, MN 55121. Study completion date – April 9, 2014. Project No. A16319.

This study was conducted against Human Immunodeficiency Virus type 1, Strain HTLV-III_B. The product was received ready-to-use. Two lots (Lots P-11130-023 and P-11130-027) of the product, Hitman were tested according to ATS protocol SRC52021214.HIV.1 (copy provided). The Human Immunodeficiency Virus type 1 was obtained from Advanced Biotechnologies, Inc., Columbia, MD. The stock virus was prepared by collecting the supernatant culture fluid from infected culture cells. The cells were disrupted and cell debris removed by centrifugation at approximately 2200 RPM for approximately 10 minutes at 4°C. The supernatant was removed, aliquotted, and stored until the day of use. The stock virus culture was adjusted to contain 5% fetal bovine serum as the organic soil load. The stock virus tested demonstrated cytopathic effects (CPE) typical of Human Immunodeficiency Virus on MT-2 cells. Films of virus were prepared by spreading 200µL of virus inoculum uniformly over the bottoms of three separate 100 x 15 mm sterile glass Petri dishes. Virus films were dried at 21.0°C in a relative humidity of 8.1% until visibly dry (20 minutes). Carriers were sprayed at a distance of 6-8 inches from the surface of the carrier until thoroughly wet (3 sprays) at room temperature. Just prior to the end of the exposure time (3 minutes), the carriers were scraped with a cell scraper to resuspend the contents and at the end of the exposure time the virus-test mixture were immediately passed through individual Sephadex columns in order to detoxify the mixtures. Filtrates were tittered 10-fold serial dilutions and then once again filtered through Sephadex columns and then remaining titrations were performed. Dilutions were then assayed

for infectivity and/or cytotoxicity. Controls included those for treatment of dried virus film, cytotoxicity, and assay of non-virucidal level of test substance. Efficacy data were generated at the lower certified limits, consistent with the CSF

2. MRID 493950-02, "Virucidal Efficacy of a Disinfectant for Use on Inanimate Environmental Surfaces Utilizing Duck Hepatitis B Virus as a Surrogate Virus for Human Hepatitis B Virus", for Hitman, by Mary J. Miller, M.T. Study conducted at ATS Labs located at 1285 Corporate Center Drive, Suite 110, Eagan, MN 55121. Study completion date – April 9, 2014. Project No. A16322.

This study was conducted against Duck Hepatitis B virus as a surrogate virus for Human Hepatitis B virus (10/29/11 strain of DHBV obtained from Hepadnavirus Testing Inc., Palo Alto, CA) and consisted of duck Hepatitis B virus serum obtained from congenitally infected ducklings. The product was received ready-to-use. Two lots (Lots P-11130-023 and P-11130-027) of the product, Hitman, were tested according to ATS protocol SRC52021214.DHBV.2 (copy provided). On the day of use, three aliquots of stock virus were removed, thawed, combined and maintained at a refrigerate temperature until used in the assay. The stock virus culture was adjusted to contain 5% fetal bovine serum in addition to whole duck serum as the organic soil load. The stock virus tested demonstrated fluorescence typical of DHBV on primary duck hepatocytes. Films of virus were prepared by spreading 200µL of virus inoculum uniformly over the bottoms of six separate 100 x 15 mm sterile glass Petri dishes. Virus films were dried at 20.0°C, and a relative humidity of 50% until visibly dry (30 minutes). For each lot of test substance, two dried virus films were individually exposed for 3 minutes to the amount of spray released under use conditions. The carriers were sprayed until thoroughly wet (2 sprays) at a distance of 6-8 inches at 20°C and held for the exposure time. Just prior to the end of the exposure time, the plates were scraped with a cell scraper to resuspend the contents and at the end of the exposure time (3 minutes) the virus-test mixture was immediately passed through individual Sephadex columns in order to detoxify the mixtures. Filtrates were tittered 10-fold serial dilutions and then once again filtered through Sephadex columns utilizing the syringe plunger. To further aid in removing the cytotoxic effect of the test substance to the indicator cell cultures, the 10^{-2} dilution for each replicate was passed through one additional, individual Sephadex column prior to performing the subsequent titrations. Dilutions were then assayed for infectivity and/or cytotoxicity. Controls included those for treatment of dried virus film, cytotoxicity, and assay of non-virucidal level of test substance. Efficacy data were generated at the lower certified limits, consistent with the CSF.

V RESULTS

MRID	Organism	Results			Dried Virus Control $TCID_{50}$/0.2 mL
			Lot. No. P-11130-023	Lot No. P-11130-027	
493950-01	Human Immunodeficiency Virus type 1	10^{-1} dilutions	Cytotoxicity	Cytotoxicity	$10^{5.50}$
		10^{-3} to 10^{-7} dilutions	Complete inactivation	Complete inactivation	
		$TCID_{50}$/0.2 mL	$\leq 10^{2.50}$	$\leq 10^{2.50}$	
		Log Reduction	≥ 3.00 $\log_{10}$	≥ 3.00 $\log_{10}$	

MRID	Organism	Results			Dried Virus Control $TCID_{50}$/0.25 mL
			Lot. No. P-11130-023	Lot No. P-11130-027	
493950-02	Duck Hepatitis B Virus as a Surrogate Virus for Human Hepatitis B Virus	10^{-1} dilutions	Cytotoxicity	Cytotoxicity	$10^{5.25}$ and $10^{5.00}$
		10^{-2} to 10^{-4} dilutions	Complete Inactivation	Complete inactivation	
		$TCID_{50}$/0.25 mL	$\leq 10^{1.50}$	$\leq 10^{1.50}$	
		MPN Log Reduction	≥3.55	≥3.55	

VI CONCLUSIONS

1. The submitted efficacy data support the use of the product, Hitman Spray, as a disinfectant with Virucidal activity against the following microorganisms on hard, non-porous surfaces in the presence of a 5% organic soil load for the time specified below:

Human Immunodeficiency Virus type 1	3 minutes	**MRID 493950-01**
Duck Hepatitis B Virus	3 minutes	**MRID 493950-02**

Recoverable virus titers of at least 10^4 were achieved. Cytotoxicity was observed in the 10^{-1} and 10^{-2} dilutions. Complete inactivation (no growth) was indicated in all higher dilutions tested. At least a 3-log reduction in titer was demonstrated beyond the cytotoxic level.

VII RECOMMENDATIONS

1. The proposed label claims that the product, Hitman Spray, is an effective disinfectant against the following microorganisms on hard, non-porous surfaces in the presence of a 5% organic soil load for a contact time of 6 minutes:

Human Immunodeficiency Virus type 1
Duck Hepatitis B Virus as a Surrogate Virus for Human Hepatitis B Virus

These claims are acceptable and are supported by the submitted efficacy data.

2. Label Pg. 6: *Disinfects in 5 minutes or less*, remove *or less.*

3. Label Pg. 7: The bottom table lists two claims referencing cross-contamination, both claims need to include the statement *on treated surfaces.*

4. Label Pg. 8: Remove *to stop the spread of bacteria* from the claim, *Keeps surfaces sanitized longer to stop…*